

ISS Technology Demonstration Plan

		On Orbit	Near term	2018	Planning	Timeframe based on demonstration launch
International Partnership	Human Health, Life Support, and Habitation Systems	Air – CO2	Vozdukh CDRA Sabatier Swingbed Portable CO2 monitor (2015 1 yr) LDST 2015 1 yr Capillary for Life Support (2016 1 yr) CDRA Upgrades 2016 Advanced O2 recovery	esa ACS Sabatier Adv O2 recovery from CO2		Mars (Hubble image)
		Air – O2	Elektron OGA NORS Elektron upgrade OGA Demo	esa ACS O2 Gen 1 Upgrades		
		Water	WRS SRV-K Water Monitor Suite (2015 1 yr) Separator upgrade Occluded gas separation from dispersed fluids JWRS	alt pretreat UPA/WPA Improvements Silver ionizer Next gen UPA Silver Biocide Brine processor Hygiene water system		
		Waste	ACY Waste Mgmt System	UWMS Freeze-Dry WMS Heat Melt Compactor		
		Environmental Monitoring	Gas analyzer TOCA MCAM ANITA Biomolecule Sequencer (2015 1 yr) microTAM CANA Microbial Monitor ANITA-2 MIDASS ISS Orion air monitor	Conting Air Monitor Water Quality Monitor Microbial Monitor CSA-CP replacement AMK		Asteroid Ex: Asteroid 243 Ida and its moon (Galileo image)
		Fire /Protection	OKR water foam AFOT IPK insulating water mist PFE SAFIRE replace O2 mask with filtering mask SAFFIRE II, ect.	Conting Air Monitor "smoke eater"		
		Radiation	esa DOSIS RAD-N2 REM Matryoshka-R Miniaturized Particle Telescope (2016 1 yr) ESA UCAPAD JTEPC CHENSS Radiation Shield Radiation Active Monitor			Earth-Moon (KAGUYA image)
		Crew Health and Performance	Mini Exercise Device-2 (2015 1 yr)			
	Space Power and Energy	Power Generation		ROSA Advanced photovoltaic	Advance Solar Array	
		Energy Storage	Advanced Li Ion Battery		Regenerative Fuel Cell	
	Robotics, Telerobotics, and Autonomous Systems	Sensing & Perception	Tactile sensors for dexterous exoskeleton Rendezvous & Inspection Sensor (DDVS)			
		Mobility/ Manipulation	RRM RRM2 METERON Manipulator Autonomy for Robotics EVA Robot manipulator Telerobotic time delays from ground DEX Op w Low Latency Comm EVA Robot Manipulator			
		Human-Sys Integ / Autonomy	Robonaut DTN Telerobotic control of group of robots Telerobotic control with time delay SPHERES Multipurpose Cubesat Dexterous Robot EVA/IVA Human-robotic collaboration Robotic Caretaker	Autonomous Robotics Robots Working Side-by-Side with Suited Crew Human Assist Robot		
		Auto Rendezvous/ Docking	SPHERES VERTIGO Crew Autonomy for ISS and beyond LEO Auto Rendezvous and Docking SC health monitoring RAVEN	Rendezvous & Docking Sys in Deep Space multipurpose laser comm		
		Communication/ Internetworking	SCAN OPALS METERON	LCRF		
	Computational and Navigation	Position, Navigation & Timing	NICER Xray Nav			

Planned and Funded

Proposed but NOT Funded



Existing Project Details can be found at the ISS Science Web; <https://iss-science.isc.nasa.gov/searchResults.cfm?searchIndicator=Investigation>
 Projects related to exploration are listed at each SORR; <https://iss-www.isc.nasa.gov/nwo/ncco/cbp/web/issprogramrvws.shtml>

Pre-decisional, For Internal Use Only



Page 1 of 2
Revision 4/25/2016

ISS Technology Demonstration Plan

International Partnership				On Orbit	Near term	2018	Planning	Timeframe based on demonstration launch
NRC	Operational Process and Procedures	Flight Crew Analogs	1 year on orbit analog - completed			Two, 6 month increments within 500 days	Mars landing surface simulation	
		Autonomous Mission Ops	Comm Delay 1		Increased Crew Autonomy			
	Thermal Management	Cryogenic Systems	SPHERES SLOSH	ZBOT SLOSH Coating (2016 1 yr)		Cryo Acq and Trans Multipurpose on-board cryogenic system with liquid helium	In-Space Cryogenic Propellant Storage	
		Thermal Control Systems		Heat pipe (2016 1 yr) Capillary Dev Testbed (2016 1 yr) Advanced Thermal Heatpipes Dipping flow heat transfer PCM Thermal Testbed Loop Heat pipe				
		Thermal Protection Sys				THOR		
	EVA					ACES Demo In-Suit Nutrition PLSS upgrades/Suit demo		
	Entry, Descent, and landing Systems	Instrumentation and knowledge	REBR Entry of space objects into the rarified upper atmosphere	TPS & Aeroheating Exp (2016 1 yr)				
		Aeroassist and Entry	Development and launching of nanosatellit					
	In-Space Propulsion	Electric Propulsion				Electric Prop		
				Electrodynmic tethered space syss development & utilization				
	Human Exploration Destination Sys	Sustainability & Supportability	Manufacture in Space Additive Manufacturing Facility Identification of pressurized compartment puncture coordinates	Spacecraft structure nondestructive check, with use of acoustic tomograph Heat Melt Compactor 3D Metal		On-board parts repair & manufacturing		
		Advanced Habitat Systems	UBNT Detection of Puncture by means of acoustic					
	Science Instruments	Remote Sensing / Sensors	Monitoring of extenor atmosphere and surface of ISS, diagnostics of materials and coherines Detection of perturbation sources in conditions of microgravity violation	Optical metrology system for monitoring of upper atmosphere Radiosonde observation of ionosphere by means of radiotomography and radioeclipse methods				
		Observations	Small-sized radiolocator with synthesized aperture based on microstrip active phase-aerials	Monitoring of space environment by means of electromagnetically clear microsatellites Multi-aspect spectrometry of atmospheric gravitational waves				
	Materials, Structures, & Manufacturing	Materials, Mechanisms	Chang in mech characteristics caused by space Biocorrosion-resistant materials and coatings	Material - Semi conductor, biofi projects Molecular beam epitaxy for new nanomaterials Intelligent flexible materials for deployable space structures	Antibacterial, Anticontamination and Self-Cleaning Coatings	Mechanisms for Long Duration, Deep Space Missions		
		Structures	BEAM					

Planned and Funded

Proposed but NOT Funded



Existing Project Details can be found at the ISS Science Web: <https://iss-science.isc.nasa.gov/searchResults.cfm?searchIndicator=Investigation>
 Projects related to exploration are listed at each SORR: <https://iss-www.isc.nasa.gov/nwd/ncc/cbp/web/issprogramrvws.shtml>

Pre-decisional, For Internal Use Only



Revision 4/25/2016

Page 2 of 2